



Major flood events reconstruction from a multi-proxy approach. The case study of November 1617 flood event in the Mediterranean Basins of Iberian Peninsula

David Pino (1), Armando Alberola (2), Carles Balasch (3), Mariano Barriendos (4), Salvador Gil (5), Mar Grau-Satorras (6), Jordi Mazón (7), Alfredo Pérez Morales (8), and Jordi Tuset (9)

(1) Department of Applied Physics, Universitat Politècnica de Catalunya, Barcelona, Spain (david.pino@upc.edu), (2) Department of Medieval and Modern History, University of Alicante, Alicante, Spain (armando.alberola@ua.es), (3) Department of Soil's Science and Environment, University of Lleida, Lleida, Spain (cbalasch@macs.udl.cat), (4) Department of History and Archaeology, University of Barcelona, Barcelona, Spain (barriendos@telefonica.net; mbarriendos@ub.edu), (5) Department of Geography, University of Murcia, Murcia, Spain (salvador.gill@um.es), (6) Internet Interdisciplinary Institute, Open University of Catalonia, Barcelona, Spain (mar.satorras@gmail.com), (7) Department of Applied Physics, Universitat Politècnica de Catalunya, Barcelona, Spain (jordi.mazon@upc.edu), (8) Department of Geography, University of Murcia, Murcia, Spain (alfredop@um.es), (9) Centre Tecnològic Forestal de Catalunya, Solsona, Spain (jotume@gmail.com)

The study of extreme events into climatic variability takes in consideration low frequency patterns. Therefore, it requires the use of information obtained in the preinstrumental period. Research with a multi-proxy approach is needed.

Palaeoclimatic research can use different proxy sources, however the study at meteorological scale requires to take into account the high-resolution insights from documentary evidences. European historical climatology has a long tradition studying extreme events, but mostly focused on thermal anomalies. The present research offers a detailed hydrometeorological reconstruction based on the combination of documentary sources with flood marks and hydraulic modelling. At the Mediterranean basin, hydroclimatic extremes (i.e. droughts and floods) are the worst climatic hazards. Flood events are frequent and destructive, and produce important economic losses and victims.

Thus, the present study shows meteorological and hydrological patterns for the worst flood event known in the eastern coast of Spain for the past 1000 years: the flood occurred at early November 1617. Information available at subdaily resolution offer a good idea about the development of the event, particularly concerning the rainfall episodes and the floods on different rivers, affecting eastern Spain with increasing intensity from South to North and West to East.

Moreover, hydraulic reconstructions already available and new reconstructions using epigraphic flood marks, show quantitative values from independent sources, confirming the validity of the multi-proxy data available.

During one week, more than 500 infrastructures were completely destroyed (e.g. bridges, buildings, water mills), and floods occurred at different rivers were similar or higher than maximum flow recorded during the modern instrumental period. We particularly pay attention to the case of the Llobregat River basin, which was strongly affected by the 1617 flood: in different cross sections analyzed, peak flow measurements were two times larger when compared with modern instrumental records.